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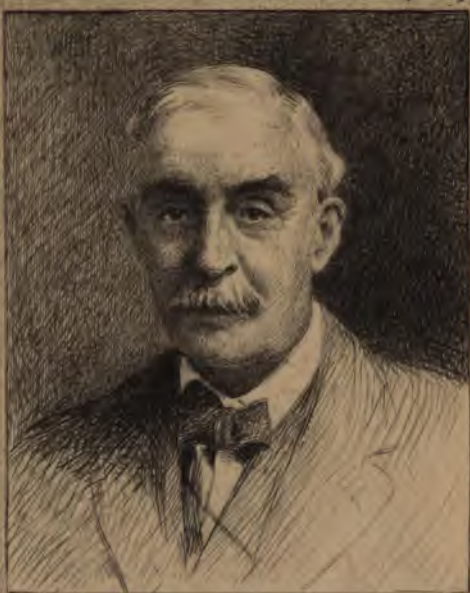
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SCIENCE
AND
THE SUPERNATURAL

BY
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SCIENCE AND THE SUPERNATURAL.

SUPPOSE that at the other end of this room there is a billiard table, the cushions of which are perfectly elastic, the surface perfectly level, and that there is a perfectly elastic ball upon this table which can roll to and fro and rebound from the cushions, absolutely without friction.

Now if this ball is supposed to be originally at rest, we say, that by reason of the "property" of inertia—a property which we conceive of as essential to matter—it will remain always at rest, unless acted upon by some other body not at rest. The action of this other body we call "force," and a body thus capable of influencing the state of rest or motion of another body, we say possesses "energy." If then we see our ball, originally at rest, suddenly put in motion, we say that the motion is due to some "*force*" which has acted or is acting upon the ball. We mean thus by "*force*" that which "*causes*" change of state of a body, and of course we can only mean by "*cause*," in this connection, the invariable and immediate antecedent of such change of state, *viz.*, another moving body which possesses "energy."

J.A.

Here we have introduced several ideas, which we claim and believe, correspond to physical facts and objective reality. Our idea of "cause" involves thus far no idea of *constraint*, but is simply the recognition of an invariable sequence, which we believe expresses a fact of nature. So our assumption of the property of "inertia," simply asserts that the ball cannot move or stop itself, and the corresponding idea of "force," asserts that the previously existing state of rest or motion can only be changed by the action of some exterior body, as for instance in our case, the cue.

These ideas, modern science claims to be *general* truths, which correspond to facts in external nature, apart from our consciousness—if you choose to separate consciousness from external nature, which modern science, as we shall see, does not and indeed cannot, choose to do—and science holds that these truths apply to *all* the matter in the Universe. No particle or atom "*in the Universe*," such is the general statement, can move itself, or change its state of motion or rest. When such change is observed, it is the "result," that is, the invariable sequence, of the action of other particles or atoms, whose state of motion is different from the first.

The *proof* of the truth of such general assertions, science refuses to seek in necessary or so-called "intuitive" ideas, because it boldly claims man himself, with his powers and mental and moral as well as physical nature, to be but a part of the more comprehensive nature he explores, and such intuitive ideas it claims as the lawful sequence of past

experience. The proof of the truth of such assertions science therefore claims to find in the facts, 1st, that they are in accord with *all* past and present experience, 2nd, that deductions from them have *always* led to conclusions verified by experience.

But our experience we all must admit, must in the nature of things, be limited. We are limited in our bodies, in our faculties of observation, in our reasoning powers and reasoning appliances, in our instruments of research and precision, and by our very position in the Universe, of which, as we know, this earth we inhabit is but a very minute fragment. We are cut off by impassable barriers of space and time from by far the greater portion of the vast Cosmos of which we thus boldly affirm the *general* facts,—and what justifies us in such daring affirmation?

Admitting, as we do and must, such limitations, what right, I ask, have we to assert, as we do assert, and to believe, as we do believe, such and such things, to be true and *general*, and to apply, not only to such small portions of the Universe as are subject to our limited faculties of scrutiny, but to the whole unexplored and unexplorable region beyond? and what right have we to be convinced as we indisputably are convinced, that we are correct in such assertions?

The answer is, that we *assume* the “methods” or sequences of Nature, to be uniform and continuous, so that from a part we can infer the whole. And when, proceeding upon such an

assumption, we find the results always to coincide with experience; as that limited experience enlarges, our initial assumption gains in probability, until the conviction of its truth becomes irresistible, and we accept it as "*proved*." This then is the fundamental basis of all science—an assumption of uniformity and continuity, the cumulative proof of which has become so strong that it has produced conviction.

From this standpoint science must proceed, or fall to pieces. Upon this assumption depends the cohesive power of the entire fabric. To this fundamental assumption it must firmly hold or cease to be. This it is, which enables us to infer general laws from special phenomena; to group together seemingly diverse facts into harmonious sequence of "cause and effect;" to tell the past and predict the future from a study of the present—and to such an extent has this already been done, and so marvellous have been the results, that the conviction has become irresistible, and the man of science to-day, can no more give up his belief in this primary assumption, than the Christian can deny his God. Attack the foundations of this belief as you may, the common sense of mankind now accepts it as the surest knowledge to which we can attain.

Science then is not at war with assumption but with assumptions. Its tendency is to reduce all to one. All must be consistent with this one, and none must contradict it. Upon this rests the so-called "method" of science; by this method it tests all hypotheses and demands, and through this method

it claims boldly "all knowledge as its province." I say advisedly, *all* knowledge.

In the language of Frederic Harrison, one of the foremost "positivists" of the day, "This method turns aside from hypotheses not to be tested by any known logical canon familiar to science, whether the hypothesis claims support from intuition, aspiration or general plausibility. And, again, this method turns aside from ideal standards which avow themselves to be lawless, which profess to transcend the field of law. We say, life and conduct shall stand for us wholly on a basis of law, and must rest entirely in that region of science, (not physical, but moral and social science,) where we are free to use, our intelligence in the methods known to us as intelligible logic, methods which the intellect can analyze. When you confront us with hypotheses however sublime and however affecting, if they cannot be stated in terms of the rest of our knowledge, if they are disparate to that world of sequence and sensation which to us is the ultimate base of all our real knowledge, then we shake our heads and turn aside."

There is no uncertain sound about such words. Such a position is not opposed to assumption or to hypothesis, for it is based admittedly upon the assumption of uniformity of law. But it demands that all assumption and hypothesis shall be consistent with this fundamental one. It is not hypothesis but conflicting hypotheses to which objection is made; not with the natural but the *supernatural* that issue is taken.

If then any phenomena are observed which are opposed to this belief in nature's uniformity the man of science properly and promptly rejects such observations. If any explanations are put forth not in harmony with it, he pronounces such explanations *super-natural*, and those who believe them he calls *superstitious*. Observe, he does not claim to be able to explain all such phenomena himself; he is very ready to admit that there is much, very much, which is dark, must perhaps always remain dark to him—but he holds that the true interpretation, if ever found, must accord with his fundamental assumption of uniformity, and he rejects at once all interpretations which do not. He believes that all “super-natural” theories—theories, that is, which contradict this principle—must be replaced by natural theories, that is, theories which are in accord with this principle. He hopes that in time they may be. But until they are, he refuses to have anything to do with them and is content to wait. There is no room in his creed for the *super-natural*.

But while in this respect he is unbending and even intolerant, he is very liberal indeed to any endeavor to explain natural phenomena “in terms of the rest of our knowledge,” in accord, that is, with the “uniformity of Nature.” Any hypothesis tending in this direction he will patiently listen to, receive, discuss, and judge solely upon its merits in this respect, in the most candid and fair-minded manner. It is no objection to him that the hypothesis leaves much to be explained which must still remain dark, for all hypotheses do this; nor that

analogy is made use of and the imagination severely taxed, for several received hypotheses do this also; nor that faith is called in to accept much that cannot be accounted for otherwise, for faith of this sort lies at the bottom of the entire scientific structure—but just so far as the new hypothesis goes to extend his knowledge of nature upon the assumption of the uniformity of nature's laws just so far he will consider it. He will believe in "ethers" and "atoms" and "molecules" and mysterious "properties" and "affinities," wondrous "fluids" and "vital forces," "correlations" and "conservations" without end—all and any of which are quite as hard to conceive of and make quite as severe a tax upon his faith and intellect as any supernatural hypothesis; and he believes cheerfully and readily, just so soon and just as far as the facts warrant, simply because such things are in harmony with uniformity of natural law; that is, simply because such things are "*natural*" and not "*supernatural*."

This position is undoubtedly a strong one and, to the scientific man, it is a necessary one. To admit at this day any breach in the continuity of nature or any break in the uniformity of natural law, is to give up more than can be gained; to renounce all our most certain knowledge in favor of an hypothesis which can only introduce disorder and bring chaos back again.

And yet there are not wanting those at the present day, and there have never been wanting such at all times, who assert and believe that there is more in nature than the uniform action of her

laws. That back of the material lies the spiritual, behind the law stands the law-giver, and that *this* hypothesis is as true, as certain and as worthy of belief as that upon which science rests. This may even be said to be a universal belief of mankind and to have been held and accepted at all times and long before Science itself began to be. I think I may even venture to assert that this belief is held by those present here to-night, and that scientific men hold it also, not as a scientific doctrine, however, but rather as a thing apart—as pertaining to that real of the *super-natural* into which Science cannot enter and with which Science, therefore, cannot conflict.

But it is becoming more and more apparent that this position is untenable, and that such an armed neutrality cannot long continue. Science, as we have seen, claims the realm of *all* knowledge. Material there is, spiritual there may be, but *super-natural* there is not. Such an hypothesis can only be held as an expression of the natural, or not at all. The contrary may be good religion, it certainly is not sound science.

Now what has prevented the acceptance of this belief by scientific men, not as a doctrine of the supernatural, but as a fact of the natural?

Why is it not boldly and fairly discussed as a purely scientific hypothesis upon purely scientific grounds? It is certainly suggested by analogy; it satisfies imperative intellectual demands; it coincides with universal belief and commands to-day, as is has commanded always, universal assent. That

it certainly explains much in this Universe otherwise inexplicable, no one who has thoughtfully considered it can deny ; and as we shall soon see, it is in harmony with that conviction of continuity which guides to-day all scientific investigation, and gives answer to the perpetual inquiry of science as formulated by Mill :

“ What are the fewest and simplest assumptions, which, being granted, the existing order of Nature would follow ? ”

Why then should it not long since have been propounded by scientific men, upon purely scientific grounds, as a scientific hypothesis ?

The reason as we see, can only be the *supernatural basis* upon which the hypothesis is supposed to rest. A will outside of nature acting in nature—a spiritual cause manifesting itself in material effects—seems a breach of continuity and an assumption of supernatural agency. *As such*, in this shape, every scientific man must repudiate it as untenable or else forfeit the intellectual heritage of his age, and agree to live in a world where uniform action of natural law is a delusion, where reason is useless and feeling unchecked, may end in any extremity of license and extravagance.

That such is the tendency of this cutting loose from the fundamental basis of all science, is shown clearly in the pseudo-science of the day, with its delusions and extravagance, its table turnings and inconsequential miracles, its inconsistent superstition and still more inconsistent skepticism. To all such,

Science applies its crucial test and the result is a swift dismissal.

But with our religious belief the case is more serious. Why must the scientific man keep his science in one pocket and his theology in the other, and let not his left hand know what his right hand doeth? Here seems a real issue and a real conflict. That the conflict is terribly real, there can, I think, be no doubt. But that the issue is a real one, may be open to question. I do not think the issue is real, and I propose to try to show to-night that it is not. Science has much to learn and much to do ere her last stone is laid and her grand edifice complete, and when it is, theology should be the head of the corner—the cap-stone which the builders rejected. But until this can happen, theology must sooner or later bring science to its aid, before its demands can have the stamp of truth and command unbiassed and willing assent.

Here then is, I think, the real issue of the great “conflict” of the age, of which we have all read and thought and heard and talked so much. Is the spiritual necessarily the *super-natural*? I propose to try to show that it is not. That the belief in an intelligent creative will is not a statement of a *super-natural* belief, but a statement “in terms of the rest of our knowledge;” not “disparate to that world of sequence and sensation which to us is the ultimate base of all our real knowledge,” but a genuine scientific hypothesis, suggested by analogy and confirmed by experience; not contradicting the fundamental law of uniformity but accounting for

it—and, judged upon its merits, as a scientific hypothesis, commends itself as the best one which harmonizes all the facts, and rewards the search of science for the “fewest and simplest assumptions, which, being granted, the existing order of Nature would follow,” by tracing back all such assumptions to one necessary and sufficient hypothesis, the proof of which becomes cumulative and ends in conviction.

I wish to treat this hypothesis as a purely scientific one. Let us now return to our billiard table.

Suppose the ball upon that table to be set in motion by a stroke of the cue. It would, as we assume, move on forever in a straight line, unless acted upon by some other body. It will roll on then, until it strikes the cushion. From the cushion it will rebound at an angle equal to the angle of incidence, and, both ball and cushion being perfectly elastic, it will roll on its new direction with unchanged velocity until it strikes another cushion, and there being no friction, it will thus dart from side to side forever.

Now, given the mass of the ball, its velocity and direction of motion at any instant, the mathematician might predict unerringly just where it would be and how moving at the end say of a thousand years. He might also work backwards and tell just where it was and how moving a thousand years previously, *provided it had been in motion as long as that.*

But this is a very important proviso. He can

tell the future to a certainty, but he can only tell the past down to any given instant before the cue came into play. In the system as he finds it, no mathematics can possibly reveal the action of the cue, or tell just when the original impulse was given.

If then, we were to venture the hypothesis that at some time in the past, motion had been imparted to the ball, our mathematician would tell us that he had no means of testing such an hypothesis. His equations do not contain it. They can reveal nothing which has not been put into them. It might be true or it might not be true. He found the ball rolling, it will roll forever, he can trace its motions forward in time to any extent, *provided no exterior force act upon it*, and he can trace its motion backward in time to any extent, *provided no exterior force has acted upon it*,—and that is all. Of these two provisos he knows nothing. It may have been rolling forever for aught he can say to the contrary. The probability of any hypothesis to the contrary, must be established, if at all, by considerations very different from any his mathematics can furnish. The hypothesis that the ball has been rolling and will roll forever as he finds it, is just as reasonable to him as any other.

It is the dream of the mathematician that were *all* the laws and conditions to which matter is subject known, he might predict with the same unerring certainty the position and motion of every particle of matter in the Universe. The problem, though infinitely more complex, is the same in kind, and

were it possible to solve it, the solution would bear the same relation to any supposed origin of motion. It would neither make for nor against such an hypothesis.

Now let the physicist take his turn at our table. Suppose then, that our mathematician's eyesight were greatly increased in power so as to surpass the most powerful microscope. He would now be astonished to find that the rolling billiard ball when it struck the cushion *never really touched it at all*.

It is to-day an accepted fact in physics that *absolute contact* between bodies or atoms never takes place. When atoms are brought near together they begin to resist being brought nearer, and the smaller the distance the greater the resistance. Actual contact, the physicist says, never takes place.

But if action at a distance be a fact, it is one wholly incomprehensible to us. It cannot be stated in terms of the rest of our knowledge." From a mechanical standpoint it is inconceivable. The man of science promptly rejects it as "logically and physically absurd." The greatest philosopher the world has ever seen, when brought face to face with this strange fact, pronounced it an absurdity so great that no man who has, in philosophical matters, a competent faculty of thinking, can ever fall into it." But it is this same *Newton* too, a quarter of a century later, with riper experience and wisdom, and a broader vision, asked, "Have not the small particles of bodies certain virtues, or forces by which they act at a distance?"

The physicist says, "No!" He believes it not to be a fact, but only an apparent difficulty. In the light of fuller knowledge he hopes it will disappear. And so he builds up his "atom"; and in the attempt to get rid of one incomprehensible mystery, introduces several others, all equally incomprehensible, and endows his atom with "attraction" and "repulsion" and "affinities,"—all of them forces *acting at a distance*; and having thus erected a coherent system of *little* mysteries instead of one big mystery, would fain rest content. But intellectual contentment is not attained, and nothing has really been explained. "Explained"! What is the scientific meaning of "explanation"? Prof. Clifford tells us that we have "explained" something when we have been able to "break it up into simpler constituents which are already familiar." But suppose the thing won't break up; then it cannot be "explained." Suppose the elements into which it breaks up are themselves just as unfamiliar as the original? Then it cannot be "explained"; for one incomprehensible, we have several. Suppose the elements into which it breaks up *are* familiar—what then? Is the mystery any the less for being familiar? What has been "explained"? Nothing! We have simply formed a coherent system, based upon the incomprehensible—that is all!

Such is the difficulty in the present case. Nature is not explained by being pulverized. Atoms, we say, cannot be in contact, for then there would be no longer atoms, but a solid mass. Very well! Now fill up the void spaces between the atoms with an

"ether," if you will; but if your ether is composed of atoms separated by voids, by what have you profited, and what have you "explained"? Pour ether into ether; and still the mystery remains! Your atom itself now becomes the centre of a whole complex system of astronomy as incomprehensible as that which the telescope reveals. Atomic forces are no less incomprehensible than the "perpetual miracle" of gravitation which rules the planets, and by no means as "familiar." The infinitesimal is as hard to comprehend as the infinite. The difficulty is absolutely unchanged in kind, and even greater in degree. We push the incomprehensible farther and farther back, but still remains the ultimate and inexplicable.

But why not face the difficulty and accept action at a distance as an ultimate fact? Because it is contrary to experience? But experience confirms it. All forces, in the last analysis, act at a distance. Because it is incomprehensible? So must any *ultimate* fact of nature be; for any fact which can be "explained in terms of the rest of our knowledge" must be *not* ultimate. The meaning of "*ultimate*" is "*inexplicable*"; and this, therefore, is no valid objection. If we can ever trace sequence to its ultimate origin, we must expect to find that origin not capable of being "explained" or broken up into familiar elements. What then is the only valid objection? It is this: *not* that it cannot be explained, but whether it is capable of explaining. This is our only test—the scientific test—its capability of explaining, and of explaining *all* "in terms

of the rest of our knowledge." We cannot have *two* ultimate facts. Continuity forbids it. But one, it would seem, we must have; experience, reason, "intellectual necessity," all demand it. We cannot have "occult forces"; but we must, apparently, have one "occult cause,"—not outside of nature, but in nature; or else the circle of our knowledge, starting at any point, should always bring us without solution of continuity to the point of beginning. But this is not the case. Every direction in which science moves, sooner or later ends with this break—*action at a distance*. The circle of the sciences, we find, is not a circle at all, but a *loop*; and with what shall we close it? To meet the difficulty, we need, not hypotheses, but one sufficient hypothesis; and if this hypothesis is the only one which can bridge over the break, which brings all into uniformity and into agreement with experience and known analogies of nature—such an hypothesis, *comprehensible or not*, ought to be eagerly seized by the scientific man, as the expression of that ultimate, and therefore inexplicable, fact which is the key to this mysterious riddle of the universe.

But the mathematician finds that our table with its rolling ball is an ideal conception only. No bodies are frictionless or perfectly elastic. He finds that our ball, after each impact, rebounds with diminished velocity, and must finally come to rest. To the mathematician the problem is now more complex, but unchanged in kind.

Nor is the state of things essentially changed

when the physicist takes up the investigation, and shows us the vibrating atoms in the ball and in the cushion—reveals to our mental vision the omnipresent ether of space with its inexplicable properties—properties admitted, although inexplicable, because they are in terms of other inexplicables, that is, in “terms of the rest of our knowledge”—when he explains to us the relation of heat and work and the persistence of energy. Nay, more, we can follow him far beyond the boundaries of our table in his marvellous tour of the Universe, as he traces the different forms of energy through all their correlations back to his vibrating ether and atoms, and interprets them all in terms of motion and matter. We may go out with him into the planetary spaces and trace all energy to the sun. We may trace back the sun to a fiery nebula and find in it the “promise and potency of all.” At every step the harmony becomes more impressive, science after science falls into line, as the whole marvellous mechanism is gradually unfolded and resolves itself into beautiful simplicity and unity, and wondrous variety in unity—but still the problem is essentially unchanged! Given, uniformity of natural law; certain unvarying relations of cause and effect; certain assumed and incomprehensible qualities and properties; a certain assumed mechanism in agreement therewith;—and a grand mathematics might compass it all. Still we are as far as ever from understanding action at a distance. Still unaccountable “properties,” “occult forces,” which we cannot explain, mysterious laws, whose inter-relations we

can trace, whose uniform action predict,—whose origin lies hid.

And now, with all these wonders known, and still more wondrous things unknown; the region of mystery increasing directly with the advance of knowledge; with dim recognitions of "order," "purpose" and "design," of "power," "beneficence," and "intelligence," starting everywhere out of the blackness like spectral lights, dancing to and fro to our confusion; what can we do, but hold fast with resolute grip to the one principle of uniformity which has taken us so far and yet ever leaves us farther to go, and still seeking, as we must seek, "the fewest and simplest assumptions which, being granted, the existing order of nature would follow," cry out in utter bewilderment, "what does it all mean?"

The answer must reduce the number of hypotheses, not add one more to the list; and it must be in terms of our experience and make still more assured our belief in that principle of uniform action of natural law which we will not, nay, *cannot* relinquish. This answer, if answer there be, we must find *in Nature*, suggested by sound natural analogy, for supernatural there is not. To commence by violating continuity is to leave science behind.

Thus far we have considered only the forces and laws of inorganic nature. But science claims and must consistently claim, the whole of Nature as her domain. And here confronts us at once another break in continuity—the origin of life. The scientific investigator traces life from its highest manifestations, through all its gradations, down it may

be, to a speck of "granulated vivified protoplasm;" and what then? What can he consistently say, except what Tyndall has said, "By an intellectual necessity, I cross the boundary of the experimental evidence, and discern in that matter which we, in our ignorance of its latent powers, and notwithstanding our professed reverence for its Creator, have hitherto covered with opprobrium—the promise and potency of all terrestrial life."

This utterance which has made so much stir in theological circles, what is it but the expression of the scientific belief in continuity? This is the "intellectual necessity" which we cannot ignore. And yet after honestly examining the evidence with all the wonderful skill of which he is the acknowledged master, and while frankly confessing that he wishes the evidence were the other way, this outspoken, clear-thinking man of science does not hesitate to say, "I affirm that no shred of trustworthy experimental testimony exists to prove that life in our day has ever appeared independently of antecedent life." Says a recent writer,* "so far as science can settle anything, this question is settled. The attempt to get the living out of the dead has failed. Spontaneous generation has had to be given up, and it is now recognized on every hand that life can only come from the touch of life." Huxley categorically announces that the doctrine of Biogenesis, or life only from life, is 'victorious along the whole line at the present day.'

Here then we have actually erected by science

* Henry Drummond.

itself into a "law"—the law of biogenesis—an apparent contradiction to that scientific belief in continuity which is an "intellectual necessity" to the scientific man. But does he admit such discontinuity? Not at all! He views the difficulty as apparent only. The issue to his mind, is not whether the organic is contained and potential in the inorganic—he still believes that it is—but simply whether the transition can be artificially effected now, "in our day." Undiscouraged and undismayed, he works on, hopes ever, seeks always—"the fewest and simplest assumptions which, being granted, the existing order of Nature would follow,"—and has always in mind, as a dream of the future, that final hypothesis which shall at last bring all into conformity, before which all discrepancies shall vanish.

But this is not the last break in our law of continuity. If the origin of life is mysterious, much more is that of sensation. The physicist can trace the rays of light as they thrill through the ether; the physiologist may explain to us the mechanism of the eye and of the nervous system and brain. But the link between the objective phenomena and the subjective sensation is beyond the power of science to trace. How is matter related to consciousness? In the presence of such mysteries "experimental evidence" fails. Such problems do indeed lie outside the domain of experimental physics,—we frankly admit it. But do they lie outside the domain of law? We cannot admit that! The principle of continuity which has led us so far, we will not reject. Those methods of research which have proved so fruitful

we cannot renounce. The repugnance to invoke the supernatural to account for the phenomena of human life is just and consistent. "Other world?" says Emerson; "There is no other world. God is one and omnipresent; here or nowhere is the whole fact." And so, somehow, somewhere, somewhen, we ardently believe, these mysterious voids are to be filled up with knowledge, and Nature is to stand forth, one grand, harmonious system, without solution of continuity, from beginning to end. This is the dream of the man of science—a dream of which he thinks he can dimly perceive, even now, the coming realization.

It is easy to relegate such difficulties to the "spiritual world," and to say that of them we can know nothing. But this is evading the difficulty. There is no "good man's croft," as Prof. Clifford well reminds us, in science, secure from the plough where the "Brownie" may live. Let us no longer dodge, but meet the issue fairly. "There is a spiritual world,"—we grant it! But that world, we say, must be a world of law,—a *natural*, not a *supernatural* world. "The spirit is distinct from matter,"—we grant it! But it must be subject to law none the less. Let us seek the laws, not shirk the issues. If the law of continuity is true, it is true throughout its whole extent,—the law of laws,—and the spiritual itself is natural, not supernatural; and of the natural it is given us, even in this world, to know. When we speak of "intellectual necessity" in science we assume this fact. When we rest scientific hypothesis upon natural

SCIENCE AND

~~and~~ we admit it. "This seeing of spiritual ~~aspects mirrored~~ in the face of Nature," this assumption of a "real analogy between the natural and the spiritual worlds,"—what is it at bottom but the assertion that "parallel phenomena depend upon identical laws?" "Phenomena," says Henry Bragg, in a recent work which well deserves all the good opinion it has met,—“Phenomena are parallel; laws which make them so are themselves parallel.”

But if we thus accept the spiritual as the natural, the assumption of the spiritual becomes a scientific hypothesis subject to scientific scrutiny. How shall we test it? It is not a subject for the crucible and retort, the scalpel or the microscope. The hypothesis, to be accepted as scientific, must be suggested by sound analogy and confirmed by its logical results. It must be in accord with the law of continuity; must account for the uniformity of action of natural law; must satisfy "intellectual necessity"; explain consciousness, origin of life and action at a distance, without solution of continuity; and harmonize all the branches of science by substituting for secondary causes and "occult" properties and forces, one sufficient and final cause. As final, such cause need not be expected to be "intelligible," or explicable in terms of the known, or even "thinkable" at all. Its proof is in what it explains, not in its capacity of being explained. A science which has to work with inexplicable "properties" and unthinkable "ethers," with mysterious "affinities" and "vital forces" and miraculous "uniformities," can

well put up with *one* inexplicable assumption, if it thereby harmonize and make intelligible all the others. Such an hypothesis, if it do this, is a "scientific hypothesis," if I understand the meaning of the term.

Let us now return once more to our billiard table; and while the ball is rolling to and fro, suppose I were to suggest to the scientific observer that the cause of the motion was *my will*,—that the ball moved as I wished, *because I so willed!*

He would, I think, reply in effect, "Nonsense! It is preposterous and impossible in the nature of things. Suppose I should cut off my own head, throw it out of the window, and then stand up and make faces at you! That would be about an equivalent supposition."

Well, now, if my supposition *is* manifestly impossible in the "nature of things," that settles it! But it might be worth while to pause and ask, what do we know anyhow about the "nature of things"? because if we happen to know nothing, we can scarcely decide the point at issue upon the assumption of knowledge we do not possess.

Now what do we know of matter in itself, and how do I know that anything outside of myself has any real objective existence? All that I know of the outside world, says Prof. Clifford, "comes to me through the medium of my senses. How do I know that these sensations *exactly* correspond to external reality? How do I know that they even correspond *at all*? If a dream were only coherent, no physical test I could apply could possibly

establish it as a dream. What right have I, then, to think that this world of sensations is not all a dream, or partly a dream? What right have I to assume that the so-called material universe has any existence at all outside of me? Bishop Berkeley held, "No right at all." But we do not believe him. Why not?

Most of us who have read that little book entitled "Through the Looking-glass," by the author of "Alice in Wonderland," will remember how "Alice" went to see the "Red King" escorted by "Tweedledum" and "Tweedledee." They found him fast asleep, and Tweedledee asks her, "What do you think he is dreaming about?" "Nobody can guess that," replied Alice. "Why, about *you*!" Tweedledee exclaimed, clapping his hands triumphantly; "And if he left off dreaming about you, where do you suppose you'd be?" "Where I am now, of course," said Alice. "Not you!" Tweedledee retorted contemptuously; "you'd be nowhere. Why, you're only a sort of thing in his dream!"

"If that there king was to wake," added Tweedledum, "you'd go out,—bang!—just like a candle!"

"I shouldn't!" Alice exclaimed, indignantly. "Besides, if *I'm* only a sort of thing in his dream, what are *you*, I should like to know?"

There little Alice hit the nail right on the head. Alice didn't believe Tweedledee's story, and neither do we. Why not? Because we are obliged to assume, and do assume, the consciousness of *others like ourselves*. When Tweedledee, or even Bishop Berkeley, tells us that everything *he* sees is *his*

dream, we appeal to Bishop Berkeley to account for *our* dream. That everything I see may be *my* dream, I might admit; but that I myself am only somebody else's dream I cannot admit. Let us continue our little parable, for surely it runs deeper than most children's stories.

"Hush!" cried Alice, "you'll be waking him, I'm afraid, if you make so much noise." "Well, it's no use *your* talking about waking him," said Tweedledum, "when you're only one of the things in his dream. You know very well you're not real."

"*I am* real," Alice said, and began to cry. "If I wasn't real,"—half laughing through her tears, it all seemed so ridiculous,—"*I shouldn't be able to cry!*"

Bravo, little Alice! Descartes himself could do no better than that, and older persons may have felt the tears start in presence of little Alice's bewilderment. Truly, this little story is deep enough for children of a larger growth, and some of us may not be so wise as Alice, to brush away tears, and resolutely set about "getting out of the wood."

We all hold, then, not only with Descartes, *Cogito, ergo sum*, but also with little Alice, *Cogito, ergo omnia sunt*. We do believe, then, in external realities; but none the less is it true that our knowledge of such realities is subjective, and when we begin to talk about the "nature of things," we only mean our knowledge of those things.

To which our man of science might reply, "Of course; that's taken for granted. No need to labour away at such length to convince me of that which I

don't deny. It is of our knowledge I speak when I refer to the 'nature of things;' and your supposition of will governing the motion of the billiard ball contradicts that knowledge."

Here, then, is the first objection: my supposition must have *analogy with the known* to recommend it. This I frankly admit, and inquire, "Suppose I succeed in showing such analogy, then what?" "Why, then it's unthinkable anyhow," replies our man of science. "But suppose I put it forward as a *final* cause?" "Why, then I should expect it to explain everything. The law of continuity will not admit of more than *one* such cause," replies our man of science. "One such cause I may accept, if it stands the test. On this ground I can allow you to discuss your hypothesis. Do you stand on this ground?"

To which I reply, "I do. Upon this scientific basis I rest my hypothesis; by this scientific test I abide."

Now, this hypothesis of Nature as the expression of will is by no means a new one. It is at least as old as theology, and it is good theology too, I believe, and I venture to think that most of my hearers accept it now, and if all I am going to do is to try to prove it, I may spare my breath. But I want to show you that it is *good science too*, and as science isn't so very old, and as this doctrine has not been very prominently put forward as "scientific," this view of it may not be without interest.

I expect to show that it is suggested by analogy, and is not only in accord with uniformity of action

of natural law, but accounts for such uniformity and makes law intelligible. That it fills up satisfactorily the breaks in continuity still outstanding, such as action at a distance, origin of life and consciousness, and while thus rounding out scientific knowledge, brings it in harmony with our intellectual necessities, and brings the whole scope of man's intellectual activities, whether in the realm of the physical, social, moral, or spiritual, into accord with our hypothesis, which accounts for, because it embraces all. In other words, the one fact in this world is the "spiritual," and all that we see and know is but the "spiritual made manifest."

First, then, as to analogy. Modern science claims to have established the fact that every motion of an animal like man can be traced back eventually to some change in the substance of the brain.

Precisely what this change is we need not now inquire. Let us admit it as a fact,—if it be a fact,—and instead of denouncing it as "subversive of free will," "making man an automaton," "atheistic in tendency," and what not, let us accept it to its fullest material realisation. No harm can come from truth by increase of knowledge. Old arguments may fail, and old grounds prove untenable; but surely it is rather early yet for us to claim an infallible *basis* even for our strongest convictions. If the new knowledge furnish a new basis, we need feel no alarm.

Suppose then, for example, that to such precision have we attained, that when I raise my arm the act can be certainly traced back in my organism to the

displacement of certain specific portions of my brain. Say, for instance, that three particles of matter in my brain which before occupied positions in a straight line with respect to each other, have now been made to change their position and arrange themselves in the shape, say, of a triangle. The work done might be estimated, the equivalent heat computed, and we might speak of the "mechanical equivalent of thought," and even give it in foot-pounds. When the physiologist has got as far as *that*,—and he looks forward even now to such a result,—I think it will be admitted on all hands that his science is pretty complete.

Now it is admitted that these three particles are under the control of my will. At any rate, I can lift my arm as often as I wish, and whatever may be the origin of the "wish," these three particles obey my will and move in subjection to it. Is there anything less wonderful in this than in the supposition that the motion of three billiard balls upon a table is governed by will also? and is not the analogy a sound one? Here observe, as in every science, when we go back to its beginnings, mechanism falls away, and this mystery of *action at a distance* stares us full in the face. It is thus in astronomy, chemistry, physics, mechanics,—in fact, through the whole range of the inorganic sciences. In the last analysis, we find all forces to act at a distance. And now, here it confronts us again in organic science also, and we find it at the foundation of biology too. But mark the *significance* with which it now appears! Whereas before it seemed

itself an ultimate inscrutable fact, now it appears *in connection with will*. Within my organism *will* is recognized as a *force* causing motion of matter; acts upon it a distance, too! Explain it as you can or may, or refuse to explain it at all, if you will. Put between the will and its manifestation as much of material mechanism as you choose, the difficulty is but pressed further back, not removed. To this conclusion we must come at last, as an ultimate, and, therefore, inexplicable fact,—that within the limitations of my organism *matter obeys will*. There is thus an advancing scale in our knowledge. To the mathematician, only inexplicable law is visible. Past and future lie hid in his equations only up to certain limits. Of that which may lie back of law, of beginning or end, there is no limit. The physicist recognizes, back of law, everywhere the inexplicable fact of action at a distance, and here *he* stops short. There seems no hope of passing beyond. The very method of science, and the whole past progress of scientific knowledge, give no encouragement to such hope. Finally, the biologist also has to face this inexplicable fact; but to him it is not ultimate, for to him it exhibits itself in a new phase, and back of it he discerns the action of *will*. Here, it seems to me, is the first ray of light. Within the sphere of my conscious activity, science recognizes this inexplicable fact of action at a distance as *dependent upon will*. Within the limits of my organism, *will* appears as a “force,”—as that which “produces motion or change of motion of matter.” This is the last word of

science, and it appears very significant. Here is our analogy.

We have met, then, the first demand upon us, and presented our analogy. Within the limits of my organism matter obeys will. Now, by virtue of my belief in continuity, the very principle which has thus far guided all scientific hypothesis; in conformity with analogy; and in the very spirit and even the very phrase of Tyndall—"by an intellectual necessity I *cross the boundary* of the experimental evidence," and refer the mystery of action at a distance, and of motion of matter *outside of my organism*, likewise to the operation of will.

This is surely scientific. It is Tyndall's position with another issue. The hypothesis is suggested by analogy and confirmed by experience; and as such the scientific man must consider it. While it sets no bounds to scientific investigation, so far as such investigation goes to reveal mechanism and to explain the unknown in terms of the known, it must, if true, ever lie outside and beyond the limits of such investigation, as the expression of an ultimate and, therefore, inexplicable fact. As ultimate, it must be found all-sufficient.

Shall we say that the motion of these three brain particles could have been infallibly predicted ages beforehand, provided all the conditions had been known,—that our three particles are like three billiard balls which have been forever dashing about on the table of the universe, and that any future state of these particles is capable of prediction in accordance with uniform laws? What, then,

becomes of my will—of my volition? At what point shall we introduce the action of the cue? Shall we say that these three particles are obedient to will, which is therefore a force of nature, but a force of which nothing can be predicated beforehand? What, then, becomes of the uniformity of law?

Here seems the scientific difficulty. We certainly have will as a power in nature suggested to us by sound analogy from known facts, but we cannot accept the hypothesis apparently without contradicting the uniform action of law, and we cannot accept the uniform action of law without removing belief in the freedom of our will. Between the horns of this dilemma we apparently stand.

"We now stand," in the words of Tyndall, "face to face with the final problem. It is this: are the brain and the moral and intellectual processes known to be associated with the brain,—and, as far as our experience goes, indissolubly associated,—subject to the laws which we find paramount in physical Nature? Is the will of man, in other words, free, or are it and Nature equally 'bound fast in fate'? What is meant by free will? Does it imply the power of producing events without antecedents?—of starting, as it were, upon a creative tour of occurrences without any impulse from within or without? Let us consider the point. If there be absolutely or relatively no reason why a tree should fall, it will not fall; and if there be absolutely or relatively no reason why a man should act, he will not act. It is true that the united voice of this assembly could not persuade me that I have not, at

this moment, the power to lift my arm if I wished to do so. Within this range the conscious freedom of my will cannot be questioned. But what about the origin of the wish? Are we, or are we not, complete masters of the circumstances which create our wishes, motives and tendencies to action?"

Prof. Tyndall is always frankness itself, and never shirks an issue. He accepts, as you see, our hypothesis as suggested by analogy and seriously discusses it. His objection and difficulty are put on the basis of uniformity of law. If man's will be free, it must be a creative cause. But if it be itself dependent upon anterior circumstances, how can it be free?

"If there be absolutely or relatively no reason why a man should act, he will not act."

This we can safely accept, I think. That is, man's will is to some extent at least, dependent upon man's knowledge. Indeed, the expression "intelligent will" is tautological. Knowledge can only come to us through our sensations—so our will must not only be intelligent—acting upon knowledge—but must also be conscious. Consciousness and intelligence are presupposed and understood when we speak of "will." But admitting man's will to be such, is it not conditioned by exterior circumstances, and if so, how can it then be free?

Now, here is, I think, a false issue, or at any rate, a side issue. The freedom of man's will may be and is a subject of the highest importance in mental and moral science. But in the present discussion, at this stage of the argument, it has, it seems to me,

no bearing. The state of the question is this: We recognize by experience that man's will—conscious and intelligent will—acts under certain restrictions upon matter, and under certain restrictions, matter is obedient to it. Recognizing this as a fact, and it is, I think, admitted as a fact on all hands, we pass, with the sanction of the highest scientific authority, by an "intellectual necessity," across the "boundary of the experimental evidence," and sanctioned by our belief in continuity, we ask, *not* if *man's* will be free, but is there a free will, *not man's*, to which all nature without restriction is obedient, and is it possible to reconcile the existence of *this* will with uniformity of action of natural law, without conditioning its freedom? This is the real issue, and I hold that in discussing *man's* freedom of will Prof. Tyndall has suffered himself to be led aside from the direct line of argument into a side issue not of vital importance to it.

We may admit, if you wish, that man's will is not free: that we are not complete masters of circumstances; that circumstances have been partly made for us; that the will may be partly if not wholly the product of environment. We may admit all this, and yet the real issue remains open, and the real question untouched. The question of automatonism may still remain open; we may concede man to be a machine, but one very essential part of our conception of a machine, *viz.*, its relation to a contriver and constructor, still remains to be disposed of, and I think I may at this point consistently refuse to be led astray into debateable land, which lies outside

the domain of the argument. It is a free will exterior to man's that is in question. And the real difficulty—accepting this will as necessarily conscious and intelligent—is to reconcile *this* with uniformity of natural law.

This is not so difficult as the discussion about man's free will would seem to make it. If we wish to affect the will of another there is only one practical way by which we can do it—by affecting him or his knowledge, which is a part of him. This is our practical recognition of the fact that will must be intelligent and hence conscious. But to change his knowledge is to change a part of *him*.

“Uniformity” means that the same causes must always produce the same effects. Now, however indefinite the meaning of that little word “cause” may be in general, there need, I think, be little confusion about its meaning in the present connection. It may be true, as Prof. Clifford tells us, that the word “cause” has “sixty-four meanings in Plato and forty-eight in Aristotle. These were men who liked to know as near as might be what they meant; but how many meanings it has had in the writings of the myriads of people who have not tried to know what they meant by it will, I hope, never be counted.” Without presuming to fix the meaning of a word whose use seems to have been so abused, it seems that for our present purpose Mill's definition will answer, and when we speak of the same causes always producing the same effects, we can define “cause” as the “sum of *all* the antecedents.” Now, of these antecedents, knowledge is at least *one*. To change

this is, therefore, to change the "cause" and hence the sequence or "effect." But to thus change knowledge implies that such knowledge was incomplete, and did not before include all the antecedents. Such is man's knowledge—limited, and such is man's will—changeable, varying as his knowledge varies. But were such knowledge complete, it would not admit of additions to it, hence it could not be changed, and as thus the only disturbing element is excluded, a will based upon such knowledge would be unchangeable, and hence uniformity of action would be a necessary result. Even man's will would thus be consistent with uniformity were man's knowledge complete. How about the freedom of such will? By freedom we do not mean absence from constraint, but simply and absolutely *self-controlled*,—not affected by exterior circumstances. Now to such a will as we speak of there could be no exterior circumstances, because all circumstances are due to it. If such a will is free, its invariable action would imply not only complete knowledge but unchanging purpose. Our intelligent conscious will then must be *complete in knowledge and single in purpose*.

Are we "padding our premises"? I think not. Such a will is in kind like our own. In degree it is the limit to which by "intellectual necessity" we must pass. Knowledge made perfect and purpose unchanging—and there, based upon analogy, confirmed by experience, in accord with continuity and *accounting* for uniformity, it seems to me, we may discern with the eye of science, even more

satisfactorily than in matter, the "promise and the potency of all."

And now, how can we test our hypothesis? We put it forth as a scientific induction and as ultimate. As ultimate, we cannot explain it in terms of the rest of our knowledge. As ultimate, its proof must be sought in its power of explaining, not in its capacity of being explained. Suggested by what we know of nature, our conviction of its truth must rest upon its power of harmonizing all that we know, in accordance with natural laws and intellectual and moral requirements, without any other hypothesis being necessary or possible.

Does it do this? I must leave the answer largely to each student of science, and I think I can safely so leave it.

Such an hypothesis or induction, of will based upon complete knowledge of the past, to which past in its entirety it is exterior, and self-controlled by unchanging purpose—to which matter is obedient—accounts for the continuity of causation and of sequence, as well as for the "intellectual necessity" which demands such continuity. Incomprehensible discontinuity disappears in the light of this induction, and the circle of the sciences is complete. The loop is filled up by its connecting link. While in no degree limiting the field of scientific research, it must ever lie back of and embrace the whole field. In the light of this induction, action at a distance—"the great stumbling-block of science to-day"—stands out as the visible expression in

terms of matter of underlying will. Not a will apart from nature—not the supernatural contradicting the unfailing regularity of nature, “interfering” with nature’s laws—but a will *in nature*, of which these laws are the unchanging visible expression.

Haeckel in his *Schöpfungsgeschichte*, divides the views of Nature into the *monistic* or “single principle” theory and the *dualistic* or “twofold principle.” The first he claims as scientific, the second as unscientific, miraculous, superstitious, the outcome of a “poetic faith” “such as can have no value in the domain of scientific knowledge.” The great service of Darwin from this point of view, was the final establishment of the “unity of *all* natural phenomena.” As Haeckel puts it, “all natural bodies which are known to us are *equally animated*. The distinction which has been made between animate and inanimate bodies does *not* exist. When a stone is thrown into the air and falls to the earth according to definite laws, or when in a solution of salt a crystal is formed, the phenomenon is neither more nor less a mechanical manifestation of life than the growth and flowering of plants, than the propagation of animals or the activity of their senses, than the perception or the formation of thought in man.”

Now in the light of our induction we also may heartily subscribe to this utterance of Haeckel, but from a very opposite view-point. For us also all natural bodies are equally animated—one neither more nor less than the other—all conforming to the

mandate of will. The distinction between animate and inanimate bodies does *not* exist for us also. When a "stone is thrown into the air and falls to earth according to definite laws," the phenomenon is neither more nor less a *spiritual manifestation of underlying will*, than the "growth and flowering of plants." Such a view is "*monistic*" and "scientific" as the other. It does not deny mechanical unity, it simply goes back of and accounts for it in strict analogy with known facts of nature. It is, therefore, no superstition, no "*dualism*," no mere "poetic faith," but simply the legitimate result of scientific monism itself which discerns the great *WILL POWER*

" In all things, in all nature, in the stars
Of azure heaven, the unenduring clouds,
In flower and tree, in every pebbly stone
That paves the brooks, the stationary rocks,
The moving waters and the invisible air."

The uniformity of natural law is thus a necessary consequence of such an induction. Such law comes out as a relation in visible terms, intelligible to us, between "spirit at one end and matter at the other," and such uniformity as but the inevitable result of complete knowledge conjoined with unchanging purpose—the physical expression of the "divine veracity." It is just what we should expect to find in such a Universe as ours. Before this one incomprehensible all others vanish—and no other hypothesis thus far suggested by natural investigation can accomplish a similar result. The correlation and conservation of natural forces, are in this

view, the necessary result of a single, constant source of energy.

The unity and continuity of law, under this view remain unbroken. The law of biogenesis—of no life without preceding life—receives now its solution in antecedent life, and merges itself into the more general expression—no consciousness without antecedent consciousness, no will without antecedent will, no spirit without antecedent spirit. Thus is continuity unbroken, and thus is it more than poetic feeling or belief in the supernatural alone, which asserts that

“The earth is cram’ed with heaven,
And every common bush afire with God.”

Whatever the ultimate decision of science as to the evolution of life, this view remains unchanged. It “allows of development to the fullest and most material extent, but prohibits material interpretation.” The material universe reveals itself only to the spiritual eye. The law of biogenesis, which appears as a break in material law, is but the physical expression of a more general spiritual fact.

Such a view satisfies our intellectual demands by positing a sufficient cause in strict analogy with experience, which while spiritual is not supernatural—which acts not because of law, but because of which law is.

Such a view, is the only one which satisfactorily accounts for the evidences of “design” in Nature, while permitting such design to be accomplished through material laws by traceable methods. It

hampers science in no respect, but gives free scope to investigation and "accepts the mechanical interpretation of nature's laws to the uttermost." It does not limit the field of investigation and say "thus far and no further," but allows to science in the freest spirit the boundless field of all that is.

In the light of this view, the standing quarrel between religion and evolution disappears from sight. It is no longer a question between divine foresight and divine interposition. There is seen to be no "interposition" possible. It is a question simply of divine method.

Let us frankly admit such a view—no harm but much good can come of it. To science belongs the whole field. Physical, social, mental, moral—it is one "reign of law," one "unity of nature," the visible expression of one will—natural, not supernatural. Let us expunge this word "*supernatural*" from our vocabulary—it has always made harm—and let science and faith strike hands not merely in amity, but in full accord. If there is a God, all roads must lead to Him, and there is no *terra-incognita*, observable by us, which needs to be jealously fenced off from the field of natural law.

From this standpoint the "*a priori* proofs" appeal with new and added force. This wondrous system—its amazing vastness, which knows no distance, includes all motions and covers all time—the wondrous variety and still more wondrous unity in variety—the absolute perfection of detail—the unlimited power—the mysteriousness—in a word, the absolute crushing *wisdom*, of the whole awful

mechanism find in this conception alone, the only intellectually satisfying *scientific* cause and reason, and far back the infinite complexity we recognize the final unity of

"one far-off divine event
To which the whole creation moves."

The idea of the supernatural, of a region on this earth closed to science, where continuity ceases and uniformity cannot be assumed, has been and is productive of harm. In the interests of truth and peace let us give it up. It is time! When one speaking in the interests of faith, and speaking with authority, proclaims this or that subversive of his faith, who is to blame, if finding this or that to be true, we *take him at his word* and deny his faith? "Trust your reason," cries Leslie Stephens, in this very spirit—"trust your reason, we have been told till we are tired of the phrase, and you will become Atheists or Agnostics. *We take you at your word*; we become Agnostics." *This is the real "conflict"*! It fills the religious press. I take up a paper at random and its editorial is to this effect: I read of the "pronounced theories" of Darwin and the "brilliant affirmation" of Tyndall. Further on these expressions naturally change to such as "domineering" and "charlatanry," and "one-sided" "superficial thinking." We learn that no "technical knowledge" is necessary to know that Tyndall can't get ethical truth "out of his retorts and crucibles." That "experimenting with blowpipes and gases" can give no knowledge

of God and the soul. That no spiritual realities can be reached by "grubbing among earthworms" like Darwin.

I have spoken to little purpose, if such remarks do not now carry their own refutation. If our writer finds that it is something to rejoice at that our "younger men" no longer "flout religion nor scoff at religious men," the gratifying result cannot be laid at his door nor ascribed to the tendency of such views as these. God's truths not to be found in retorts and crucibles!—where should they be found, if not wherever His laws are found in operation? Here, or nowhere, now or never, is God's government, and in the grand unity of that government, which it is given to man to discern, one may well rise, even from an earthworm to a star.

"Flower in the crannied wall,
I pluck you out of the crannies;—
Hold you here, root and all, in my hand,
Little flower,—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

If this is not good poetry, it is at least sound science. Wherever God's government is found on earth, science, or the study of God's laws, claims the right to go—and wherever science goes there can be no *super-natural*.

We sometimes hear deplored now-a-days, the "scientific tendency" to "push God out of His Universe," or at least to push Him further and further back, until He becomes a mere abstraction at best. Now, if all roads in science lead to God,

if all laws converge in the law-giver, how shall we ever reach the center if we go not back upon the roads? Why, to thus search back is "one of the profoundest necessities of our intellectual nature"! Has not the result thus far justified the necessity?

There is, I venture to think, a tendency more harmful than this—a tendency which has always made harm and which is hurtful to-day as ever—a tendency which not only closes the road to progress, but obscures the eye of faith—the tendency to shut up certain avenues of thought, and ticket them with the sign, "No thoroughfare! This way lies the swamp of the supernatural!"

I like to think that there is a more liberal faith than this, which holds that knowledge of the mind of God does not essentially depend upon exclusive study of the written and printed records vouchsafed to one "peculiar nation." That to all men has been made a revelation, not written or printed in perishable characters, but spread out before every man in characters which endure forever and which all may read. The lesson of this revelation has not waited for science to interpret it. The deepest rendering which science can give but confirms the reading which faith receives without question. This reading has been and is the common property of all, and the superficial glance gathers from it the deepest truths. So it has been through long ages before the birth of science, and thus only can it happen that the deepest truths of science to-day, but serve to confirm the most ancient faith of all mankind.

It is by no means an impossible or even an

